Drawings

Fig. 1

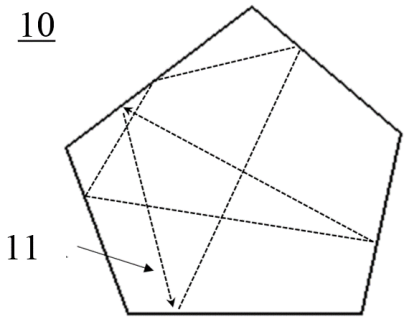


Fig. 2

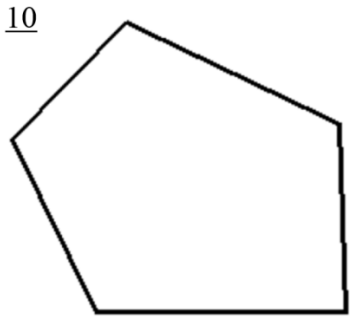


Fig. 3

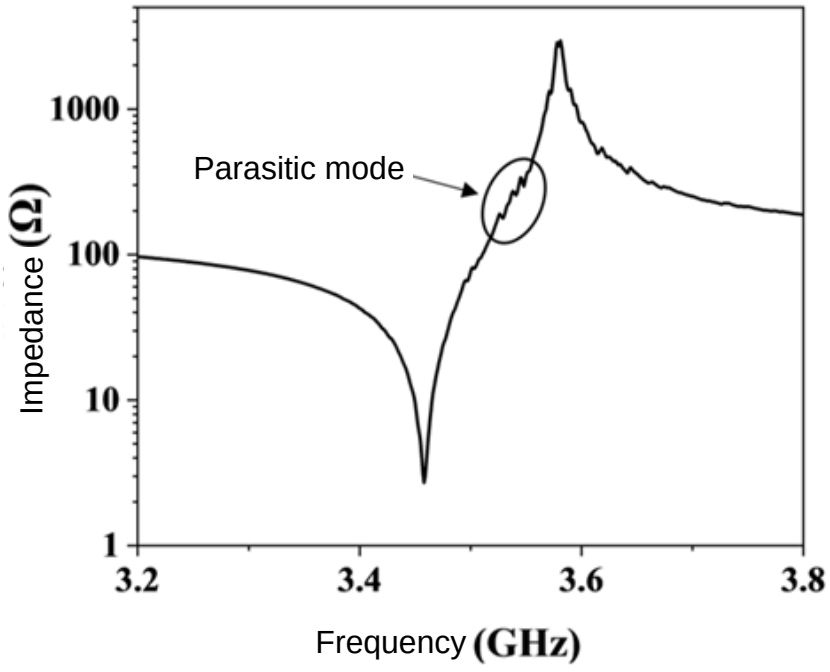


Fig. 4

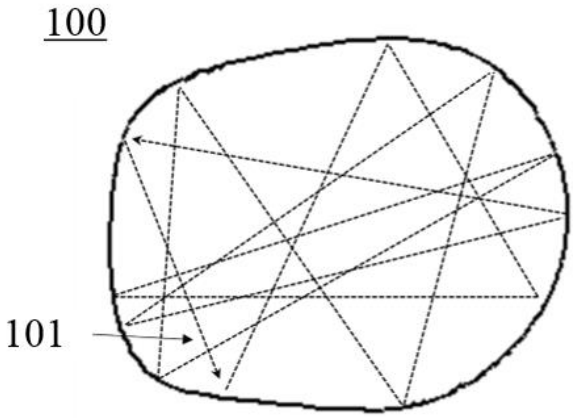


Fig. 5

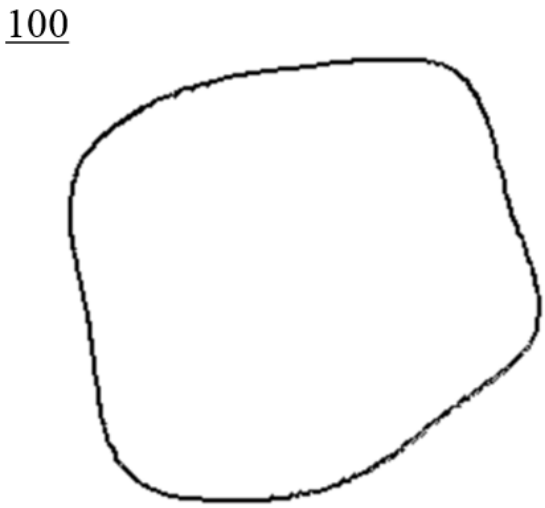


Fig. 6

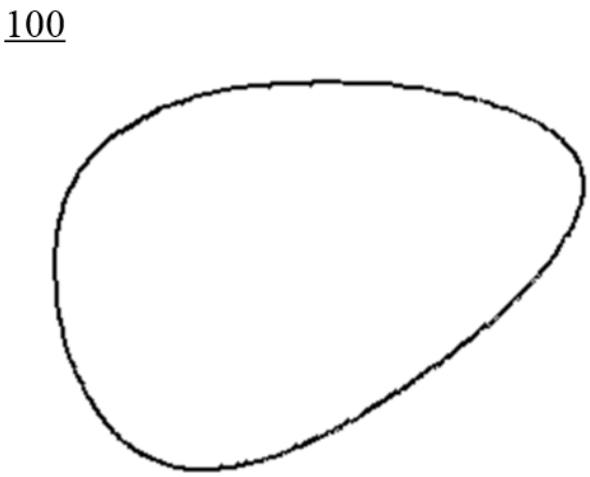


Fig. 7

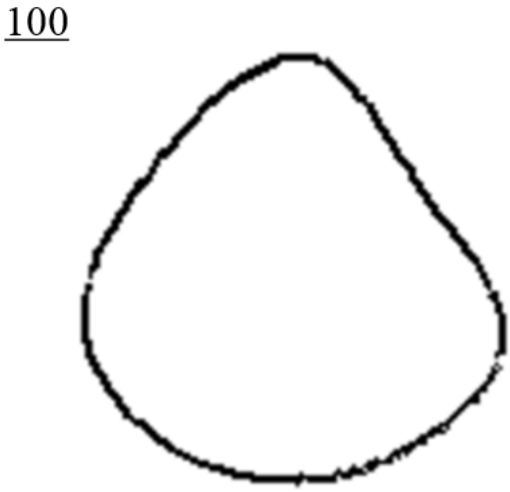


Fig. 8

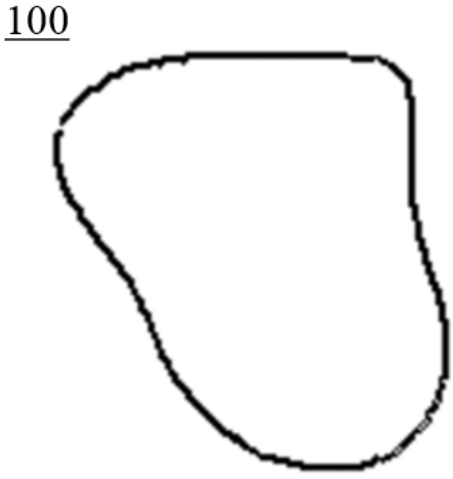


Fig. 9

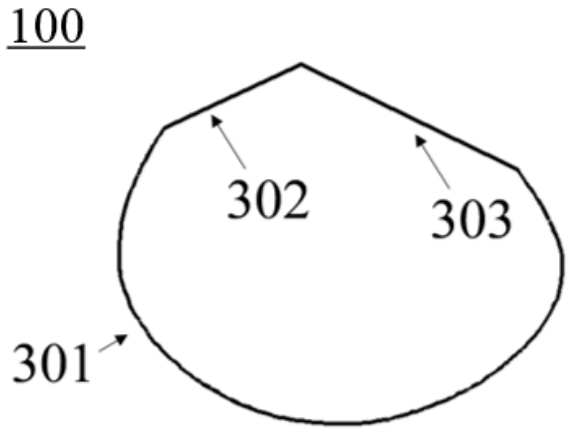


Fig. 10

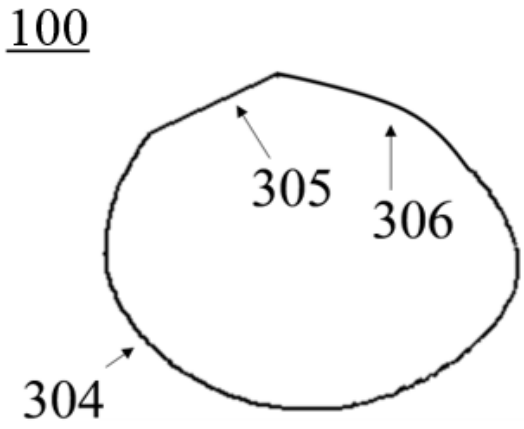


Fig. 11

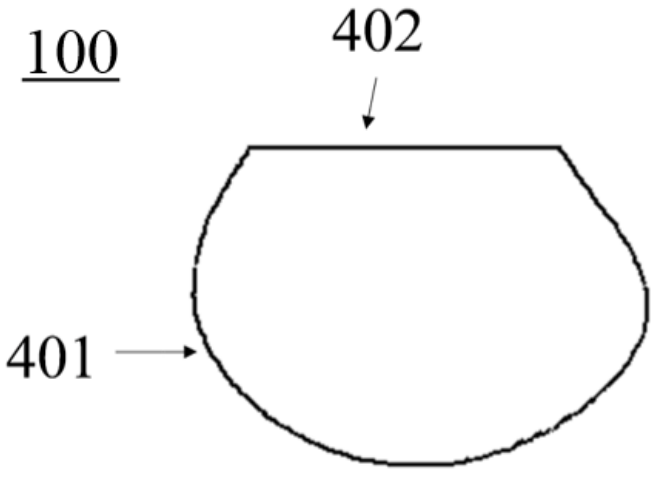


Fig. 12

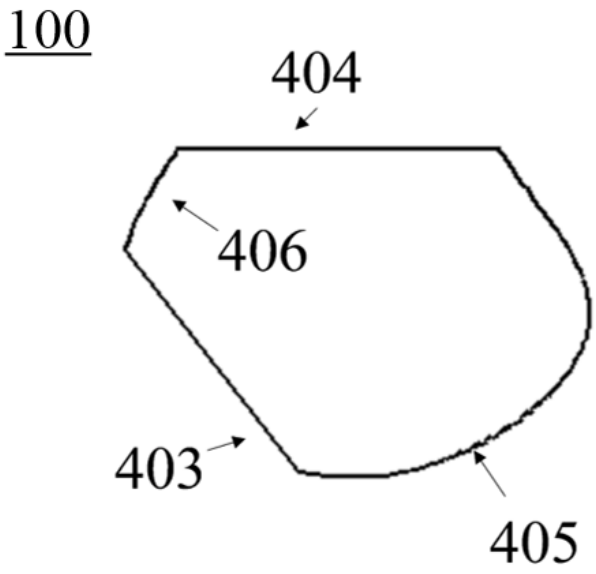


Fig. 13

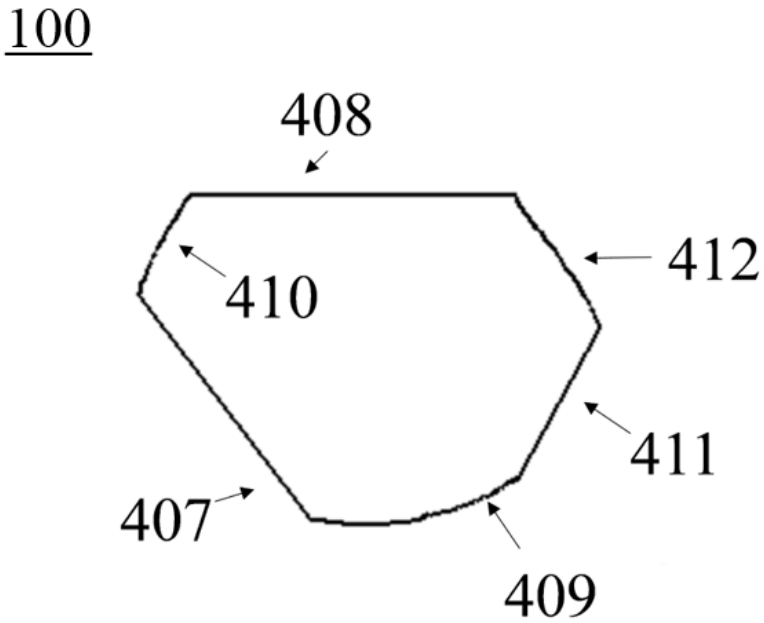


Fig. 14

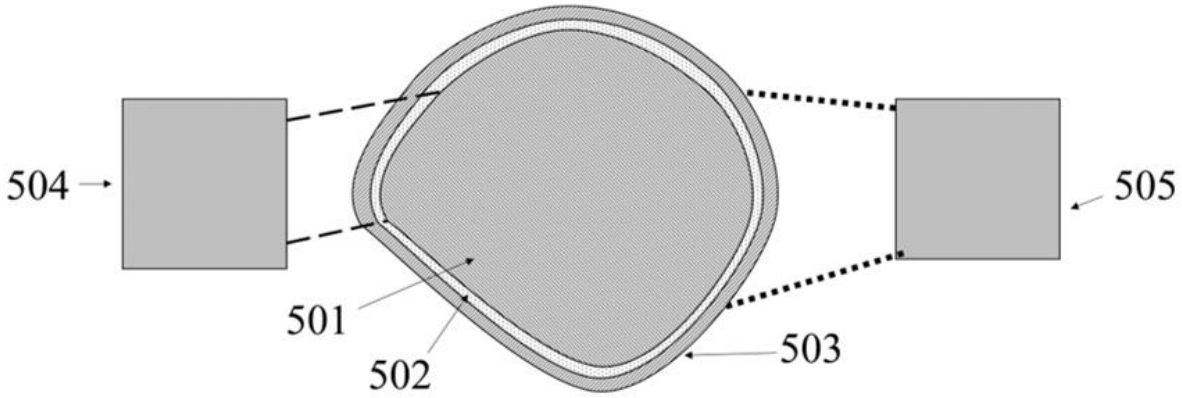


Fig. 15

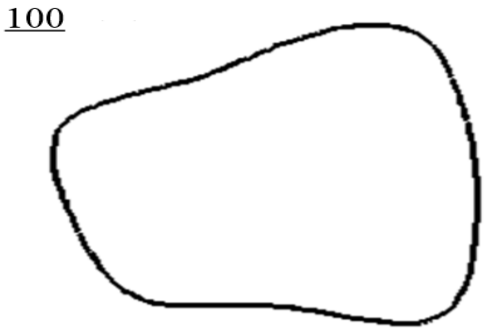


Fig. 16

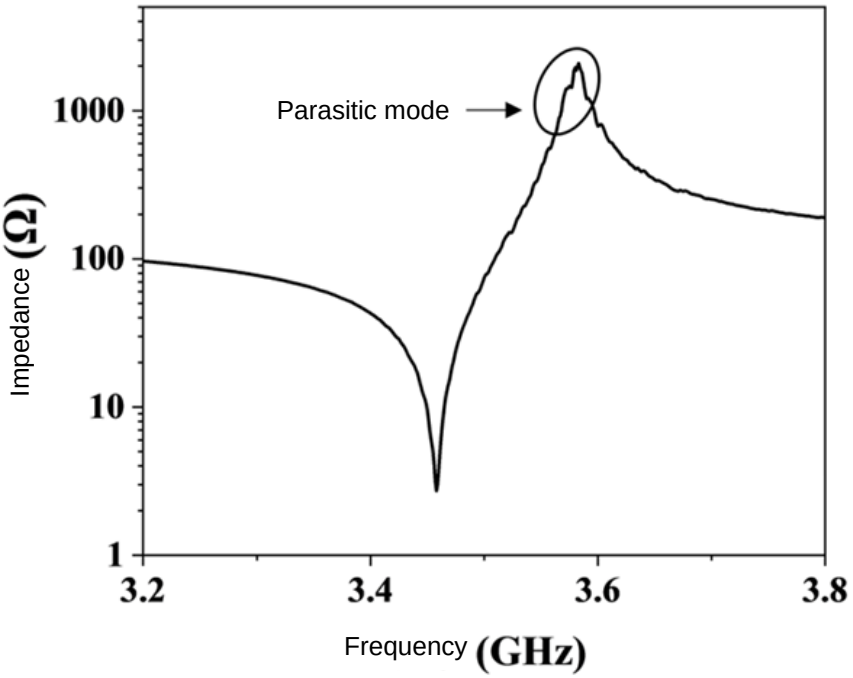


Fig. 17

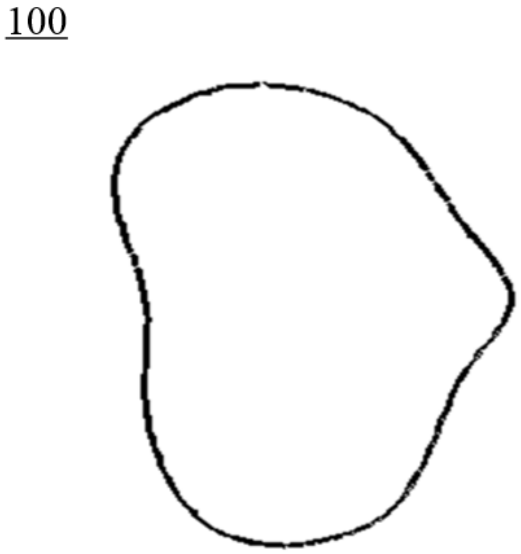

100

Fig. 18

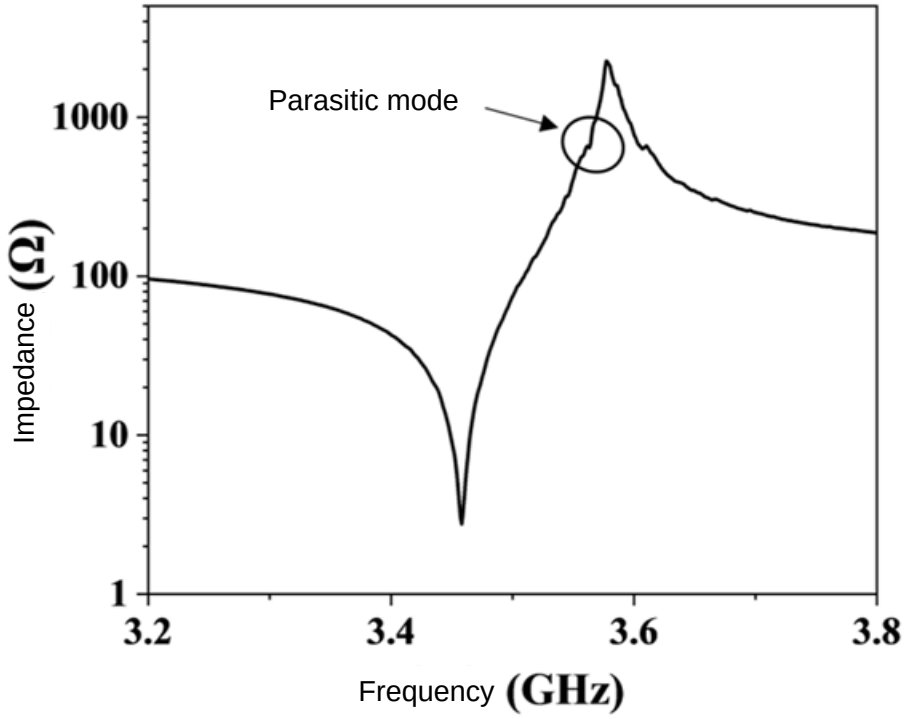

Parasitic mode
1000
100
10
1
Impedance (Ω)
3.2
3.4
3.6
3.8
Frequency (GHz)

Fig. 19

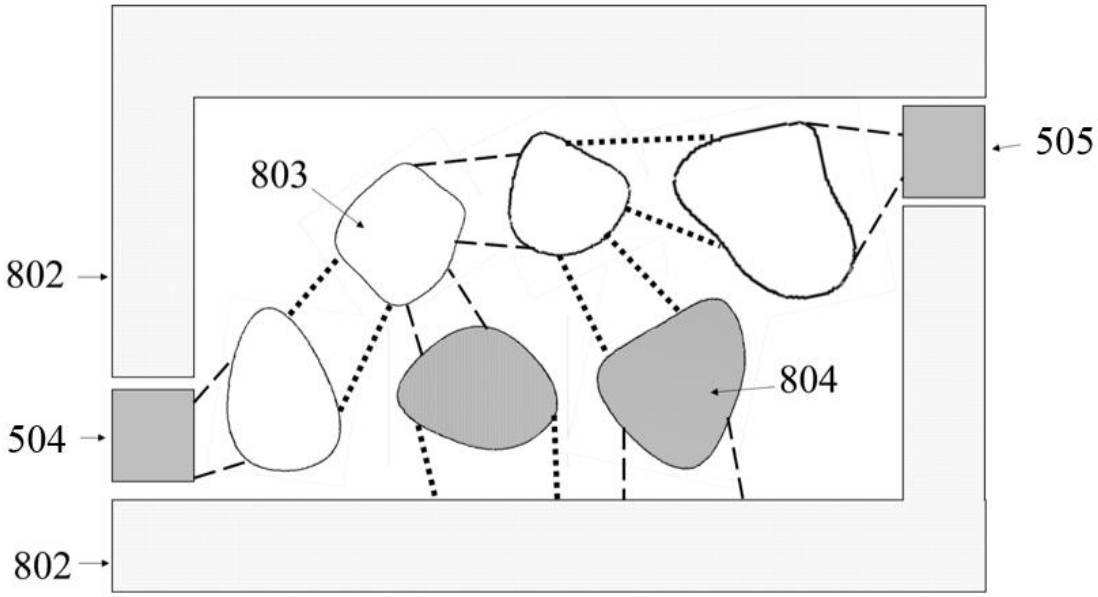

505
803
802
804
504
802

Fig. 20

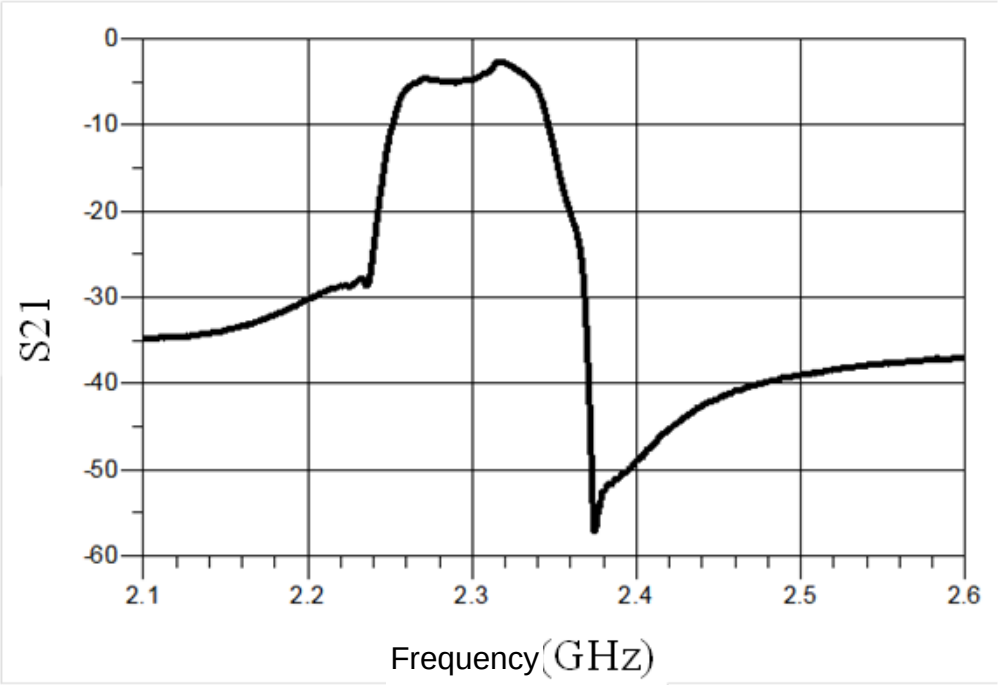

0
-10
-20
-30
-40
-50
-60
S21
2.1
2.2
2.3
2.4
2.5
2.6
Frequency (GHz)

Fig. 21

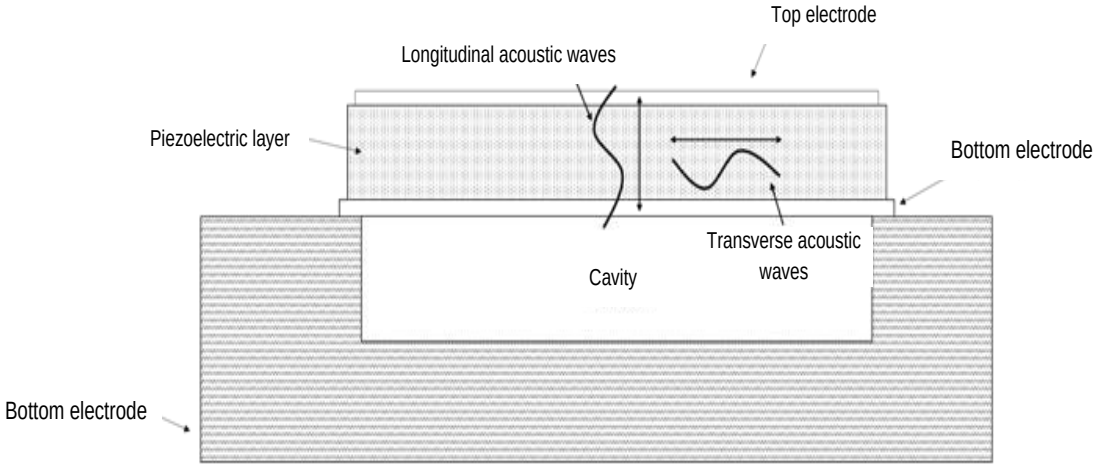

Top electrode
Longitudinal acoustic waves
Piezoelectric layer
Bottom electrode
Transverse acoustic waves
Cavity
Bottom electrode

Fig. 22

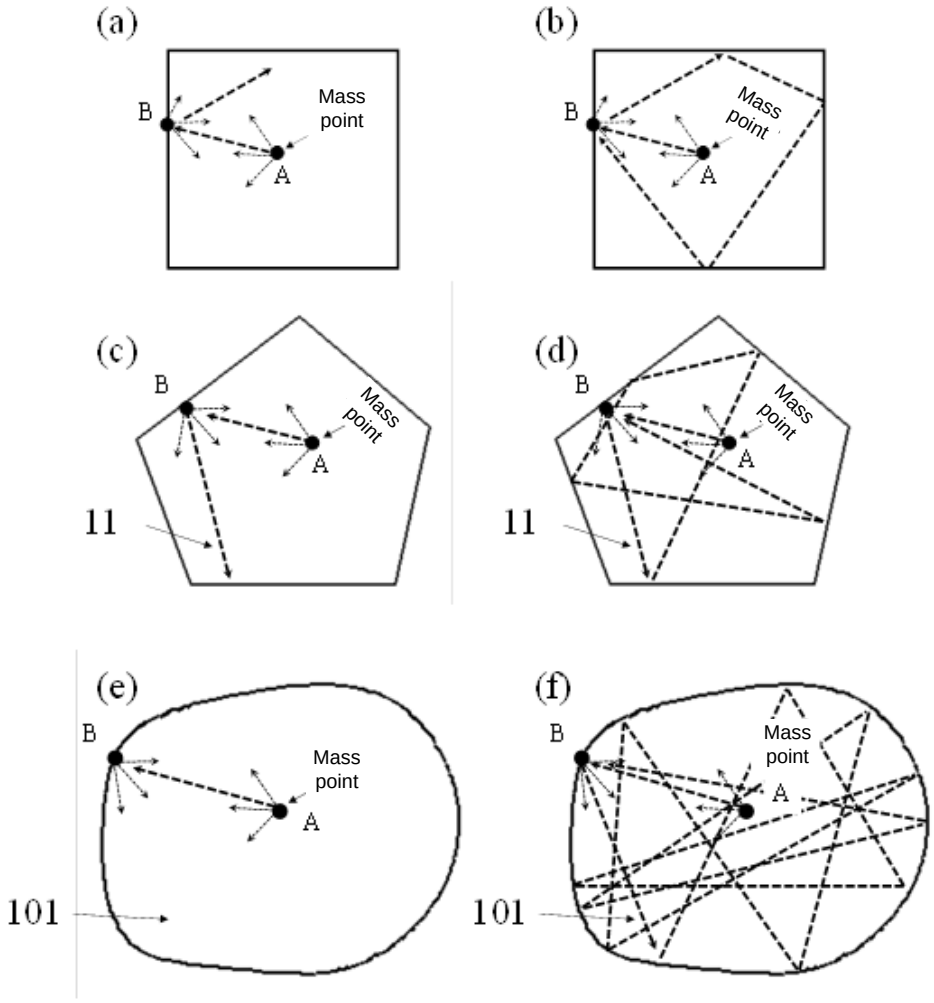

(a)
B
Mass point
A
(b)
B
Mass point
A
(c)
B
Mass point
A
11
(d)
B
Mass point
A
11
(e)
B
Mass point
A
101
(f)
B
Mass point
A
101

Fig. 23

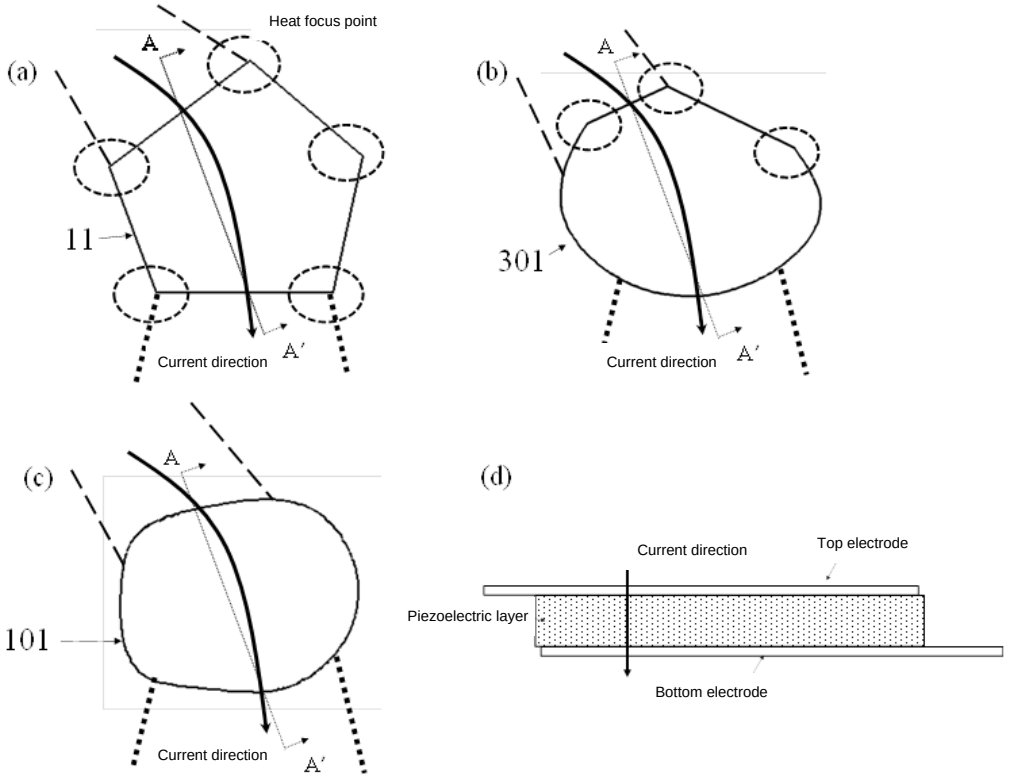
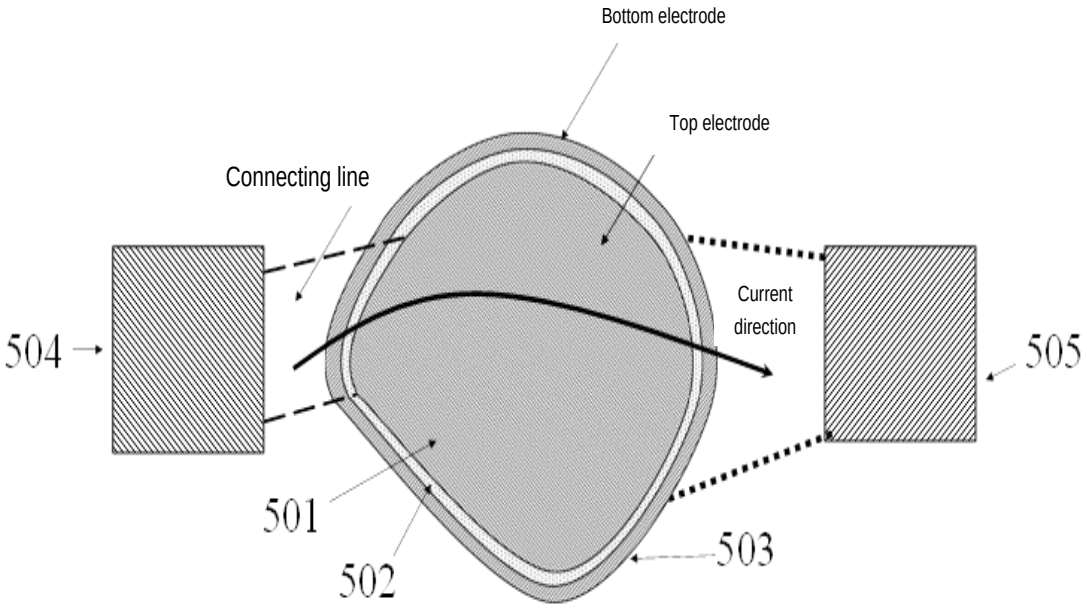

Heat focus point
(a)
A
11
Current direction
A′
(b)
A
301
Current direction
A′
(c)
A
101
Current direction
A′
(d)
Current direction
Top electrode
Piezoelectric layer
Bottom electrode

Fig. 24


Bottom electrode
Top electrode
Connecting line
Current direction
504
505
501
502
503